

OSTEOSYNTHETIC BONE PLATE

The invention relates to an osteosynthetic bone plate with several round and/or oblong holes, disposed in the longitudinal direction for accommodating bone screws, as well as associated bone screws and a drilling jig.

An osteosynthetic pressure plate with several holes, disposed in the longitudinal axis of the pressure plate for accommodating bone screws, is known from the Swiss patent 6 73 762. The cross-sectional profile of the pressure plate is such, that the sectional areas through the pressure plate, parallel to the bone surface, expand as the distance from the bone surface increases. The underside of the pressure plate, which is intended to rest on the bone, additionally has spherical depressions, so that, immediately after the implantation, cavities result between the bone and the pressure plate. The holes are constructed oblong symmetrically to the longitudinal axis and, at their longitudinal walls, have an abutment, which is lowered with respect to the upper side of the pressure plate and on which the head of a screw can be shifted parallel to the longitudinal axis. For using the pressure plate, the surface of the bone is disintegrated by known surgical techniques, the bone fragments are assembled and aligned, the pressure plate is mounted and a secure connection is brought about by pressing firmly and bolting with the bone screws. Although, after the bone fracture has healed, the pressure plate can more easily, that is, without the help of instruments and without destruction of the newly formed bone lamellas of the plate (Translator's Note: *sic!*), the care of the bone and its healing still are adversely affected by the strong contacting pressure of the pressure plate on the surface of the bone.

It is therefore an object of the invention to develop a bone plate with associated bone screws and a drilling jig, which enables the bone fragments to be connected securely even under compression conditions and is achieved only by the seating of the bone screws in the bones.

Pursuant to the invention, the objective set is accomplished by the distinguishing features named in claim 1.

As is known, the osteosynthetic bone plate is aligned at the bone, on which it is placed loosely without having to remove the periosteum. The drill guide bushing is inserted consecutively into the holes with the conical thread, the bone fragment is pre-drilled and the thread is cut in the bone. Subsequently, the drilling jig is removed and the bone screw is screwed in until the head of the screw is seated firmly in the bone plate. To ensure that the bone screws are seated firmly in the bone fragments, they should be self-cutting and only the first threads should be pre-cut.

The advantages, achieved with the invention, consist particularly therein that the osteosynthetic bone plate does not produce a pressing connection with the bone surface and the stable connection of the bone fragments is achieved by jamming the head of the bone screw into the conical thread of the holes in the bone plate. As a result, the bone screw can absorb forces in all directions. By these means, it is achieved that the periosteum is not destroyed additionally and that the healing process is improved.

An advantageous development of the invention is given in claim 2. By means of this further development, it is achieved that, when the bone screw is tightened, there is longitudinal movement along the bone plate, so that the bone fragments are pressed against one another.

The further development of the invention of claim 3 permits the bone screws to be introduced precisely and to be seated firmly in the bone fragments.

The invention is to be described in greater detail by means of examples. In the associated drawings,

Fig. 1 shows a bone plate with an inserted drilling jig and bone screw,

Fig. 2 shows a bone plate with an oblong hole for accommodating the bone screw and

Fig. 3 shows a plan view of the bone plate of Fig. 2.

An osteosynthetic bone plate 1 has, depending on its use, several holes 2 for accommodating bone screws 3. The holes 2 are such that they have a conical thread 4 extending in the direction of the bone surface. Analogously, the head 5 of the bone screw 3 is also provided with a conical thread. Moreover, the thread lead of the bone thread and that of the head thread of the bone screw 2 are the same. A drilling jig 6, which can be inserted into the holes 2, also has a conical external thread, which extends analogously to the conical thread 4. The drilling jig 6 furthermore is provided with a continuous internal thread 7 for guiding a threading tap.

Due to the configuration of the holes 2 in the bone plate 1 and of the screw head 5 of the bone screw 3 with a conical thread, it is achieved that the screw head 5, during the tightening in the bone plate 1, is jammed and the bone screw 3 thus is thus connected firmly with the bone plate 1. The position of the thread, which is to be cut in the bone, with respect to the conical thread 4 in the bone plate 1, is ensured by the guidance of the threading tap in the drilling jig 6.

The advantage of this solution lies therein that the secure connection of the bone fragments is attained not by pressing the bone plate 1 onto the surface of the bone, but by the seating of the bone screw 3 in the bone fragments. With that, the periosteum is not adversely affected additionally and the healing process is accelerated.

In a further embodiment, shown in Figs. 2 and 3, at least one hole 8 in the bone plate 1 may have an oblong shape parallel to the longitudinal axis of the bone plate 1, the terminal radii having different dimensions. The radius, averted from the bone fracture site is smaller than the radius facing the bone fracture site. The hole 8 is conical and provided with a peripheral, internal thread 9. The conicity of the hole 8 once again corresponds to that of the head 5 of the bone screw 3. The advantage of this solution lies therein that, when the bone screw 3 is tightened, movement takes place along the bone plate and, with that, the bone fragments are compressed.

Claims

1. Osteosynthetic bone plate with several round and/or oblong holes, for accommodating bone screws, as well as a bone screw and a drilling jig, characterized in that holes (2), disposed in the bone plate (1), are provided with a conical thread (4), which extends towards the surface of the bone, that the bone screw (3) has a head (5) with a conical external thread extending analogously to the conical thread (4) and that the drilling jig (6) has a conical external thread extending analogously to the conical thread (4), as well as an internal thread (7), which is identical with the bone screw (3) and disposed centrally.

2. The osteosynthetic bone plate of claim 1, characterized in that at least one of the oblong holes (8), disposed in the bone plate (1), is provided with terminal radii of different dimensions and a peripheral, conical internal thread (9).

3. The osteosynthetic bone plate of claims 1 and 2, characterized in that the thread lead of the bone thread and the conical external thread of the screw head (5) are identical.